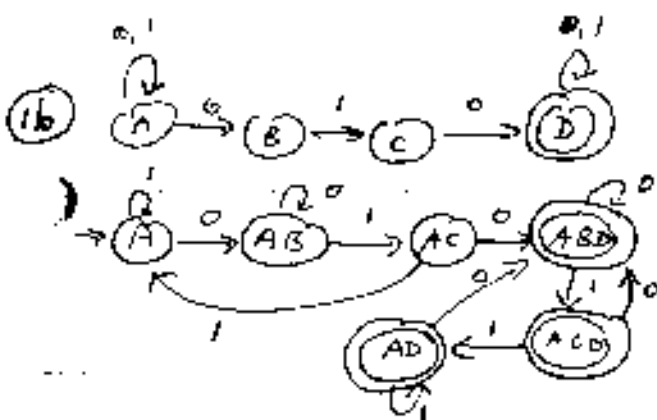
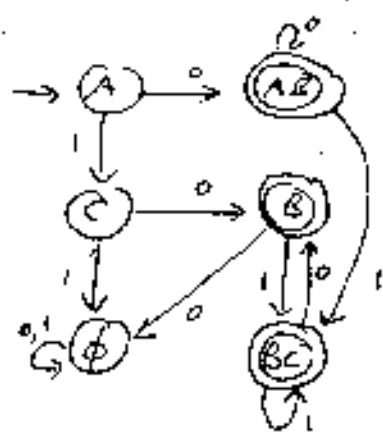


CMSC 430 - EXAM 1
ANSWERS



2a

$$A \rightarrow 0A \mid 0B \mid 1C \mid 0$$

$$B \rightarrow 1B \mid 1C \mid 1$$

$$C \rightarrow 0B \mid 0$$

2b

$$A \rightarrow 0A \mid 1A \mid 0B$$

$$B \rightarrow 1C$$

$$C \rightarrow 0D \mid 0$$

$$D \rightarrow 0D \mid 1D \mid 0 \mid 1$$

3) $S \rightarrow Xa \mid Yb \mid bXb$

$X \rightarrow c$

$Y \rightarrow c$

(a) **LL(1)**

~~S~~ $S \rightarrow Xa$

$\text{First}(Xa) = \{c\}$

$S \rightarrow Yb$

$\text{First}(Yb) = \{c\}$

$\text{First}(Xa) = \text{First}(Yb)$ so

... conflict, so not LL(1).

(b) **LR(0)**

state 0) $S \rightarrow \cdot Xa$ $X - 1$

$S \rightarrow \cdot Yb$ $Y - 2$

$S \rightarrow \cdot bXb$ $b - 3$

$X \rightarrow \cdot c$ $c - 4$

$Y \rightarrow \cdot c$

state 4) $X \rightarrow c \cdot$ conflict, inadequate state, so not LR(0)

$Y \rightarrow c \cdot$

(c) **SLR(1)**

From LR(0) table, state 4):

$\text{Follow}(X) = \{a, b\}$

$\text{Follow}(Y) = \{b\}$

so still conflict in state 4)

so not SLR(1).